

REMARKS

Applicant appreciates the thorough examination of the present application, and the withdrawal of the election/restriction requirement that was set forth in the previous Official Action. Applicant further appreciates the indication that Claims 2-6, 12-18, 20 and 40 are directed to allowable subject matter. Applicant has rewritten Claims 40, 12, 14 and 17 into independent form to address the objections to Claims 2-6, 12-18 and 40. Additionally, Applicant has added new dependent Claims 41-45 and 49-53. Applicant has also added new independent claim 46 and dependent claims 47 and 48. For the reasons discussed herein, Applicant respectfully submits that all of the pending claims are patentable over the cited references.

I. Independent Claims 1, 7, 19 and 46 are Patentable Over Kume

Independent Claims 1, 7 and 19 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,188,976 to Kume et al. ("Kume"). Each of Claims 1, 7, 19 and 46 are directed to a non-volatile memory device that includes, among other things, a "charge storage insulator." The Official Action cites to the "interlayer insulator" of Kume that comprises a silicon nitride film 19 that is sandwiched by two silicon oxide films 18, 20 as disclosing the claimed "charge storage insulator" of pending Claims 1, 7 and 19. Applicant respectfully submits, however, that the "interlayer insulator" of Kume does not comprise such a "charge storage insulator."

In particular, as discussed on page 1 of the present application, there are at least two different types of flash memory non-volatile memory devices. In the first type, a two level gate electrode structure is provided that includes a control gate and a floating gate. In this type of flash memory device, the charge is stored in the conductive floating gate. In the second type of flash memory device, a single gate memory cell transistor is provided that further includes a charge storage insulator. In this second type of flash memory device, the charge is stored in the charge storage insulator.

Applicant respectfully submits that the non-volatile memory devices disclosed in Kume each use transistors having a two-level gate electrode structure as the memory cell transistors. (*See, e.g.,* Kume at Col. 5, lines 49-64, discussing how the transistor has a floating gate and a control gate). Kume teaches that "[t]he control gate 21 . . . serves to

control an electric potential of the floating gate electrode 17 through an electrostatic capacitive coupling among the interlayer insulating films 18, 19 and 20." (Kume at Col. 8, lines 40-44). As such, the memory devices of Kume do not include the "charge storage insulator" that is recited in each of Claims 1, 7 and 19. Instead, in the devices of Kume, the charge is stored in the conductive floating gate 17. The interlayer insulator 18, 19, 20 of Kume facilitates changing the electric potential of the floating gate electrode through electrostatic capacitive coupling. (*Id.*). The devices of Kume are directed to providing improved interlayer insulators that provide increased capacitive coupling between the control gate and the floating gate. (*See, e.g.*, Kume at Col. 1, lines 19-54). Thus, as Kume does not disclose or suggest providing the charge storage insulator recited in each of pending Claims 1, 7 and 19, Applicant respectfully submits that the rejections of those claims should be withdrawn. New claim 46 is patentable for at least the reasons set forth above.

Claim 1 also stands rejected as anticipated under 35 U.S.C. 102(e) by Korean Patent Publication No. 1020020094505 to Choi et al. ("Choi"). As noted in the Official Action, Applicant can overcome this rejection via an appropriate showing under 37 C.F.R. 1.132. As shown in the attached declaration under 37 C.F.R. 1.132, the present inventor also was the inventor of the subject matter of Choi that is cited as anticipating Claim 1. Accordingly, the rejection of Claim 1 based on Choi should be withdrawn in light of the present showing under 37 C.F.R. 1.132.

Claim 1 also stands rejected as anticipated under 35 U.S.C. 102(e) by Korean Patent Publication No. 1020020001088 to Cho et al. ("Cho"). As noted in the Official Action, Applicant can overcome this rejection via an appropriate showing under 37 C.F.R. 1.132. As shown in the attached declaration under 37 C.F.R. 1.132, the present inventor also was the inventor of the subject matter of Cho that is cited as anticipating Claim 1. Accordingly, the rejection of Claim 1 based on Cho should be withdrawn in light of the present showing under 37 C.F.R. 1.132.

II. Claim 10 is Patentable Over the Cited Art

Claim 10 stands rejected under 35 U.S.C. § 103(a) as obvious in view of Kume. In particular, the Official Action states that it would have been obvious to a person having ordinary skill in the art to include an insulating metal oxide layer as part of the charge storage

insulator as this simply involves selecting a known material based on its suitability for the intended use. Applicant respectfully traverses this rejection.

Claim 10 depends from Claim 7. Accordingly, Claim 10 is patentable over Kume for the same reasons (discussed above) that Claim 7 is patentable over Kume. In addition, Applicant respectfully submits that the Official Action fails to show that including an insulating metal oxide layer as part of the charge storage insulator would have been an obvious design change to the device of Kume. In fact, Kume instead teaches that specific implementations in which the interlayer insulator comprises, for example, a silicon nitride layer sandwiched by two silicon oxide layers provides improved performance compared to prior interlayer insulator implementations. Accordingly, Applicant respectfully submits that the Official Action has failed to show that one of skill in the art would have been motivated to modify the memory devices of Kume to arrive at the invention of Claim 10.

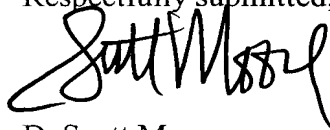
III. Claims 2-6, 12-18 and 40 are Now in Condition for Allowance

The Official Action states that Claims 2-6, 12-18, 20 and 40 are objected to as each depending from a rejected base claim, but otherwise are patentable over the cited art. As noted above, Applicant has rewritten Claims 40, 12, 14 and 17 into independent form. As such, each of Claims 2-6, 12-18 and 40 are in condition for allowance. Claims 41-45 are allowable as depending from an allowable claim,

IV. Conclusion

Applicants submit that the present application is in condition for allowance and the same is earnestly solicited. Should the Examiner have any matters outstanding of resolution, he is encouraged to telephone the undersigned at 919-854-1400 for expeditious handling.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "D. Scott Moore", is written over the typed name.

D. Scott Moore
Registration No. 42,011
Attorney for Applicants